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(54) **Locker for a delivery or collection system.**

(57) A locker for a delivery or collection system, comprising a storage chamber, an access panel for the storage chamber and an authorising unit for authorising access

to the storage chamber via the access panel; the locker further comprising means for recording delivery or collection of goods from the storage chamber.

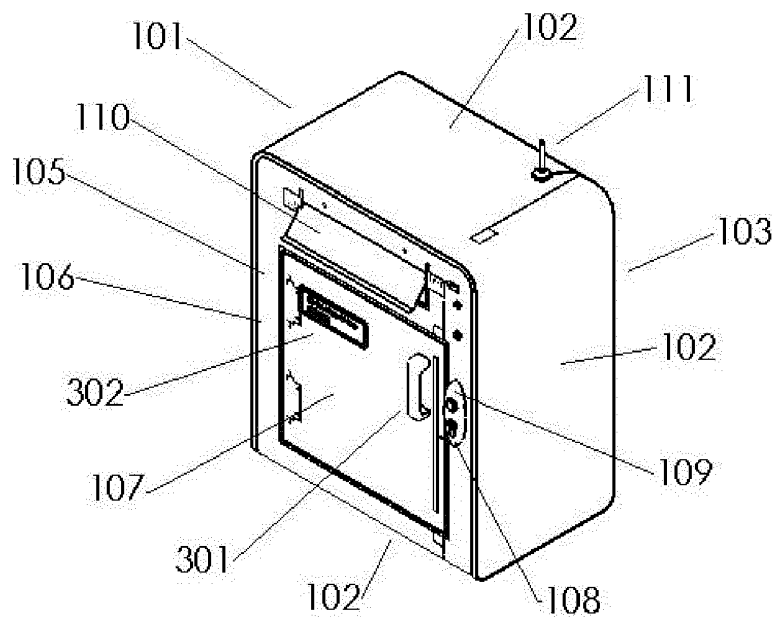


Figure 1

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Description

Field of the Invention

[0001] The invention relates to a locker for a delivery or collection system.

Background to the Invention

[0002] The increasing use of catalogue, mail order and internet shopping has seen a corresponding increase in the use of delivery services. Large quantities of goods are now bought 'on-line' or via other communications means, with the supplier or purchaser normally engaging a delivery service for the purposes of transporting the goods to the purchaser.

[0003] In many cases, deliveries of purchased goods are to unattended locations, identified either by an address or Global Positioning System, GPS, location. These deliveries are often problematic for a delivery company leading to increased administration and/or re-scheduling costs. Other less than satisfactory solutions used by delivery companies, include leaving a "sorry we missed you" message and calling back the following day, often to no avail, the handing over of goods to an intermediary or neighbour, or a last minute detour to an alternative delivery location. Some situations result in the goods having to be returned to the originating supplier.

[0004] Commonly 'Proof of Delivery' is required by the delivery company for administrative purposes, such as billing, delivery tracking and delivery verification. 'Proof of Delivery' is often recorded as a 'time/date' stamp with accompanying customer receipt signature. Where deliveries are made to an unattended location, such a Proof of Delivery is not possible.

[0005] Unattended deliveries can be frustrating and inconvenient for the recipient of the goods. Causes of such frustrations include being unable to accept goods, goods being left at unsecured locations, the delayed receipt of goods, loss of goods, having to visit a delivery depot for goods collection, having to re-order goods and incurring additional costs and associated delays, or indeed loss of privacy if goods are left with an intermediary.

[0006] Frustrations also exist for the delivery service. For example, when a customer books a collection service company to collect a parcel object, while a collection time is often agreed for the goods collection, in many cases one of the parties cannot make the schedule. Failed collections increase administrative and scheduling costs incurring added administration and re-scheduling costs.

[0007] The increased volume in parcel deliveries, especially when delivered to unattended locations, also results in an increased security need. Solutions offered at present often rely on leaving parcel objects in lockable containers, unlocked containers, drop-boxes, etc. Other solutions include leaving the parcel object(s) with a friendly neighbour, an intermediary, hidden around 'the back' of the property, etc. Such solutions are a security

risk. In addition, deliveries are subject to environmental exposure. An inconvenience often associated with letter post is the increasing amount of 'junk-mail' regularly deposited in letter or mailboxes.

[0008] A number of parcel delivery & collection solutions exist on the market. There exist standalone drop boxes which may include an entry flap, chute, etc for object delivery into an internal compartment. In some cases the drop box includes a key lockable door which may be left open, pending a parcel delivery, and which locks after the delivery takes place. Other enclosure solutions incorporate electronic components including items such as an internal control unit, electronic lock, secure keypad access, a communications means, etc. With these solutions the delivery party is normally provided, in advance of making a delivery, with a key means to unlock the enclosure.

[0009] Such a means may include mechanical keys, access codes and wireless codes.

[0010] Locker clusters such as those used in apartment complexes often incorporate electronics with a communications capability. These lockers can offer different levels of functionality and are sometimes managed by a computerised control centre. For example, the delivery person may contact the control centre either by phone, or from a cluster locker central key panel, informing of a pending delivery and who the package is for. The managing centre in turn may unlock an available locker, or send an opening code to the delivery person, and the delivery person places the package in the designated open locker. In other cases the delivery person may have access to a secure code or swipe card which always opens a locker for delivery purposes. After the delivery takes place the managing centre transmits a message to the intended apartment recipient which includes a once-off 'pin' number which the recipient uses to retrieve the package. When the recipient removes the delivery package the keypad pin is reset thus making the locker available for another delivery. A major disadvantage with these systems is the cost associated with their management. Similar systems which incorporate communications have the added disadvantage that they may be subject to jamming.

[0011] The increased volume of parcel deliveries and related issues described suggests a need for a more efficient and secure and cost effective delivery locker to benefit all parties in the delivery chain.

Summary of the Invention

[0012] The invention as described herein with reference to the appended claims is directed to a locker for a delivery or collection system, comprising

a storage chamber, an access panel for the storage chamber and an authorising unit for authorising access to the storage chamber via the access panel; the locker further comprising means for recording

delivery or collection of goods from the storage chamber.

[0013] The provision of means for recording delivery or collection of goods from the storage chamber means that additional security is provided for the owner of the box. Furthermore proof of delivery to or collection from the box is facilitated.

[0014] The means for recording delivery or collection of goods from the storage chamber may include at least one of the following:

a first device for recording data including a visual image of an interior of the storage chamber;
a second device for recording identification data for identifying an accessor of the storage chamber; or
a display unit for displaying a unique identifier of the storage chamber.

[0015] The second device may also be configured to record a barcode on the package to be delivered.

[0016] The first device may be a camera unit mounted within the interior of the storage chamber. The second device may be a camera unit mounted to the external chamber. These first and second devices may record one or more images such as photographs or a stream of images such as a video segment. The display unit may display a unique identifier such as a barcode or the like which can be scanned to prove that the delivery person has been at the storage unit.

[0017] The locker may further comprise means for recording the time and date of an authorised access.

[0018] At least one of the first or second device may be configured to record identification data of the goods for delivery or collection, said identification data selectable from a list including a barcode, QR code or RFID code.

[0019] The means for recording delivery or collection of goods may be activatable on opening the access panel or on closing the access panel subsequent to an authorised access and/or means for recording delivery or collection of goods may be remotely activatable.

[0020] The means for recording delivery or collection of goods may be de-activatable on closing the access panel subsequent to an authorised access or after a predetermined time period or is remotely de-activatable.

[0021] The locker may further comprise means for detecting unauthorised interference with the locker and generating an alert in response to the detection.

[0022] The locker may further comprise a communication module for external communication with the locker.

[0023] The communication module may be configured to periodically transmit a message to an external device and periodically receive a message from the external device wherein if a message is not received from the external device the communication module is further configured to generate an alert message. This handshaking facilitates anti-jamming detection as described below.

[0024] The access panel may further comprise a flap

through which goods can be deposited in the chamber. This allows for different size packages to be delivered to the locker, without the need to access the storage chamber. The flap may be lockable.

[0025] The locker may further comprise an interface for interfacing with an external device, the external device including at least one of a motion sensor, a security gate, a security light, a camera or an audio unit.

[0026] The locker may further comprise means for controlling the internal temperature of the storage chamber.

[0027] The authorising means comprises a locking mechanism for locking or unlocking the access panel.

[0028] A further embodiment of the present invention includes a delivery system comprising a plurality of lockers as outlined above and further comprising a control unit for remote control of the delivery system.

[0029] A first locker of the plurality of lockers may be configured as a master unit for controlling the remaining lockers in the plurality of lockers.

Brief Description of the Drawings

[0030] The invention will be more clearly understood from the following description of an embodiment thereof, given by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a front isometric view of a locker.

Figure 2 is a rear profile view of the locker of Figure 1

Figure 3 is a front isometric view of the locker of Figure 1 with an open front access panel showing a locking mechanism in situ.

Figure 4 provides a detailed view of a lock and a receiver plate of the locking mechanism shown in Figure 3.

Figure 5 is an isometric view of a locker wherein the side panel has been removed to reveal a control unit. Figures 6, a to d, are a plurality of isometric views of an envelope flap assembly in disjoint and assembled form.

Figure 7 is a view of the envelope flap of Figure 6 in situ.

Figures 8 a and b are front and rear profile views respectively of an embodiment of the present invention.

Figure 9 is a system view of a plurality of lockers in accordance with the present invention.

Figure 10 is a profile view of a receiver plate for the locking mechanism of Figure 3.

Figure 11 is a profile view of a stop member for the locking mechanism of Figure 3.

Figure 12 is a side profile view of the receiver plate of Figure 10 with a stop member in a first position.

Figure 13 is a side profile view of the receiver plate of Figure 10 with a stop member in a second position.

Figure 14 is a top sectional view of a locker in accordance with the present invention view with an open access panel and extruded lock bolt.

Figure 15 is a top sectional view of the locker in accordance with the present invention with a closed access panel and an engaged lock bolt.

Figure 16 is a system incorporating the locker in accordance with the present invention.

Detailed Description of the Drawings

[0031] The locker 101 is a storage unit for delivery and/or collection of goods. In a preferred embodiment the locker 101 is substantially cubic, however, it will be appreciated that it is not restricted as such. The walls of the locker 101 define an internal storage chamber where goods can be placed for delivery or collection. This chamber 104 is defined by a front wall 105, a plurality of side walls 102, in this case four and a rear wall 103. The front wall 105 of the chamber comprises a frame portion 106 and an access panel or door 107 mounted within the frame. The access panel may be hingedly connected to the frame portion 106 such that the access panel can pivot relative to the frame to provide or inhibit access to the storage chamber. It will be appreciated that the entire front wall of the locker may be the access panel. Such an access panel would be hingedly mounted to one of the plurality of side walls 102 of the locker.

[0032] The access panel 107 can be opened to reveal the internal storage chamber 104. The access panel as shown in Figure 1 is openable and closeable using a handle 301. This handle may sit flush with the access panel and may incorporate a recess into the access panel. Alternatively, the handle may have a lever structure as in a conventional door handle or a push button. In an alternative configuration, the access panel may be openable and closeable using a pressure switch arrangement. In this configuration, application of pressure to the panel 107 causes the panel to open or close. This handle may alternatively be a push button. A lock or locking mechanism 108 is also included to enable the access panel to be locked in position. The locking mechanism of Figure 1 also includes a push button 109, which may be used to activate or deactivate the lock. The push button may include a keypad or a plurality of buttons or the like. A keypad and code sequence can be used to set or release the lock. A timed press code sequence may also be entered through the push button to activate or deactivate the lock. While shown mounted on the frame 106 of the front wall 105, it will be appreciated that the push button may be located remote to the locker. In this remote configuration the push button communicates wirelessly or through a wired connection with the locker to activate or deactivate the lock. The locker 101 may be mounted as a letterbox, in racking, embedded in a wall located on a pedestal or otherwise mounted. The locker as shown in Figure 2, includes connection points 112 for connecting the locker to a mounting structure. For example, the connection points may be wall mountable back panel bolt holes.

[0033] In the configuration, shown in Figure 1, a sec-

ond access panel 110 is also provided. This second access panel 110 may be an envelope flap or letter box style flap which can be used for the delivery of letter post or other small items. The second access panel 110 is located on the front wall 105 of the locker 101 within the frame 106. It will be appreciated that the second access panel 110 may be part of the access panel 107. It will also be appreciated that the second access panel may be located in a side wall 102 of the locker. The second access panel 110 is pivotally mounted such that it pivots relative to the frame 106, access panel 107 or the wall of the locker in which it is located. This second access panel 110 can be locked independently of or in conjunction with the access panel 107. This may be implemented using the locking mechanism 108 or a separate locking mechanism, specific to the second access panel 110.

[0034] The locker 101 is also provided with an antenna 111, which facilitates communication with locker 101. The antenna 111 is mounted externally on the locker. However the antenna may alternatively be located within the locker, integral to any of the side walls 102 or located external or remote to the locker. The antenna may be used to facilitate Global System for Mobile Communications (GSM), WI-FI communications, General Packet Radio Service (GPRS) data transfers, Zigbee and/or Z-wave for example. A communication module is provided to facilitate such communications. Lead access points 114 may be provided in the rear wall 103 of the locker 101.

[0035] A display window 302 may also be provided on the access panel 107. Alternatively the display window may be mounted internally to the storage chamber. The display window may be configured to include a display to indicate optional information such as a name, address, mobile contact number, Bar Code, etc.

[0036] Access points 115, 116 for connections to external devices may be provided. These can include a power lead hole 116 for access to an external power source and/or a control lead hole and/or one or more additional apertures. The external devices to which the locker can interface may include motion sensors, alarm sirens, cameras, electric gates and/or lighting for example. External power sources may include mains power, batteries, solar power or other power source. An optional feature, also shown in Figure 2, is an opening 117 for accessing the storage chamber from the rear of the locker. A further access panel may be provided to inhibit access to the storage chamber through the opening 117. Such an opening facilitates the easy retrieval of a package from the storage chamber from the rear of the locker. If, for example, the locker is embedded within a wall of a building, the rear of the locker may be accessible from inside of a building. A ventilation grill 118 is also provided.

[0037] The locker 101 also incorporates a locking mechanism 108 further described below. The locking mechanism comprises a first component 1081 integral to the frame 106 and a second component or receiver plate 1082 mounted on the access panel 107. The first component 1081 includes a relay or other mechanism

1083 for detecting whether the access panel is opened or closed. The second component 1082 comprises means 1084 for activating the relay or other means. Means 1084 for activating the relay 1083 may be a magnet, where relay 1083 is a magnetic relay. The receiver plate 1082 also comprises a lock bolt catch hole 1086 for engaging a lock bolt 303 of the first component 1081.

[0038] The locking mechanism 108 in a preferred configuration is an electric lock. Optionally, an override feature, for example a manual key may be provided. The locking mechanism 108 is controlled using a control module 119. The controller may incorporate the communication module 113. In the sample configuration of Figure 5, the right hand side panel 102 of the locker has been removed to reveal the controls module 119. The controller may be mounted in any alternative position on the locker. The control module 119 is connectable to a plurality of devices including, for example, a plurality of sensors for example, a temperature sensor 1191, a humidity sensor 1192, a heating element 1193. Any configuration of devices may be provided. An additional fan unit 1194 is provided for the management of the internal environment of the storage chamber. The fan unit controls the air flow, and is useable to mitigate undesirable heat and/or humidity.

[0039] A heat sink may also be provided for sinking heat from the controller components. The controller 119 is switchable between the heating element 1193 and/or the fan unit 1194 in response to readings acquired from the sensors and/or from access to external sources such as interned based weather providers providing localised weather conditions and forecasts. Response actions taken by the controller are based on measurements taken from the sensors. The controller may decide, for example, to switch on the heating element 1193 if the temperature reading from the temperature sensor 1191 drops below a threshold. Additional external module connection points 306 are provided on the control module 119.

[0040] The control module 119 is arranged to interface with the sensors, locks, antenna, power and other peripheral devices. The control module 119 may also include the communication module 113 and/or a network subscriber identity module (SIM) card. The communication module 113 may be capable of identifying the contact details of incoming calls or texts. This can be used to configure or control the locker. For example an incoming message may be used as a trigger to lock or unlock the locking mechanism for the access panel 107 and/or envelope flap 110.

[0041] In the configuration of Figure 5, the control unit 119 is mounted on a removable panel 120. This optional feature facilitates easy exchange of the controller in the event of failure. This feature also facilitates locker manufacturing cost reduction and in particular ease of assembly and testing of the control module 119 prior to mounting on the side wall of the locker. A front facing camera 121 is also optionally provided. This facilitates proof of delivery and/or proof of collection. The front fac-

ing camera records an image or series of images of a person delivering to or collecting from the storage unit. These images can be stored locally to the locker or communicated to an external location for storage and/or review to determine a valid delivery. The front facing camera may also be used to record an image of the delivery package Bar Code. An internal camera 122 is also optionally provided. This camera, shown in figure 3 also facilitates proof of delivery and/or proof of collection. The internal camera is used to take a once off photograph, a sequenced set of photographs or a video stream of a delivery or collection. The recorded data can then be communicated to an external source such as the owner of the box, the delivery or collection company, a website or the like. In addition, a date and/or time stamp can be appended to the data. This facilitates proof of delivery or collection as the delivery can be verified. An illuminating means 123 is also provided illuminating the interior of the storage chamber when necessary to facilitate a clear image(s). This may be a lightbulb or flash unit. In addition an audio generating or recording device 307 may also be used to facilitate instructing the delivery person when collecting items from or delivering items to the locker. In addition, this audio device may generate alarm or other sounds to enhance security.

[0042] As outlined above an additional envelope flap 110 may be optionally provided. In a preferred configuration, the envelope flap 110 comprises flap 1101 and an envelope surround 1102. The flap 1101 is pivotally mounted in the envelope surround 1102. Pivot points 1105 on the envelope flap engage corresponding points 1104 on the envelope surround. The surround may be integral to the frame 106 or alternatively may be mounted on the frame 106 using mounts 1103 which extend from the surround. Additional stop members 1106 are optionally provided to limit the opening angle of the flap 1101 as the flap pivots relative to the surround. In a preferred configuration, these stop members are blocking pins. It will be appreciated that decreasing the opening angle will also decrease the risks associated with letter theft as it limits the ability to insert an implement into the storage chamber to extract it's contents. Optionally, hinges 1107 may be provided to facilitate removing of the envelope flap from the surround. In a preferred configuration the surround 1102 comprises a base portion 11021 which extends at an angle 11022 to a side wall 11023 in which the flap 1101 is mounted. The base 11021 is preferable at an acute angle 11022 to the side wall 11023 such that in the event that rain/water or alternative fluid penetrates the envelope flap, this fluid will flow out though the flap rather than into the storage chamber. In addition, this slanted base 11021 inhibits further the removal of the contents of the storage chamber through the flap 1101. Means for preventing the flap 1101 from opening is optionally provided. In the configuration of Figure 7, the means for preventing opening 1108 comprises wing nuts which in a vertical position prevent the flap 1101 from pivoting open. When wing nuts are in a horizontal posi-

tion, the flap 1101 is free to pivot. Alternative means for closing such as rotatable pegs or a further electric lock controlled by the control module may also be implemented. Additional sensors 1109 and 1110 are provided to signal whether the envelope flap 110 is in an open or closed position. In one configuration these sensors may be a combination of a magnet and magnetic relay. An additional locking mechanism may additionally or alternatively be provided to lock the envelope flap. Sensors may also be provided to determine whether a rear access panel is open or closed. Vibration sensors may also be included to detect external interference to the locker 101. Pressure sensors may be used to detect the placement of parcel object on a floor of the locker. Triggering of a sensor may result in an alert message being generated. This alert message may be generated by the control module 119 or the sensor and relayed from the control module 119. This alert message may be relayed to a predefined contact. This predefined contact may be the owner of the box or a renter of the box. This contact may also be a monitoring service or other predefined contact. For example, if a vibration is detected by a vibration sensor, the owner of the locker may be alerted to an attempted break in. An alert message is generated and transmitted using the communication module 113. This alert message may be a buzzer or an audio siren.

[0043] In an embodiment shown in Figure 8 a & b, a divider 124 is provided to subdivide the internal chamber. The divider may be located at any position within the chamber. A fixed divider 124 may be used to permanently provide two chambers. Alternatively a drop down shelf or divider can be pivotally mounted within the storage chamber. This pivotally mounted divider provides flexibility allowing one or two storage chambers to be provided. Alternatively a shelf or divider can be slidably mounted within the storage chamber so that the capacity of the two chambers can be altered. For example locating the divider closer to the top of the storage chamber than the bottom will result in a top chamber having a smaller capacity than the lower chamber. The shelf or divider can be slidably mounted on rails. Alternatively a series of positioning struts can be located along the inner walls of the storage chamber. The shelf can then be supported by any of these positioning struts to support the shelf or divider. In the configurations of Figure 8, the upper chamber, i.e. above the shelf may be used to collect deliveries made through the envelope flap 110. The lower chamber 126 is accessible via the access panel 107. The shelf may be maintained in a locked position using an optional lock 24. This lock may be electronic or mechanical. The two-chamber embodiment shown in Figure 8 facilitates secure letter post separation from parcel object deliveries. The two chambers shown in Figure 8 are also accessible using a rear access point 117 as described above in relation to Figure 2. This may be a single access point which provides access to both chambers or individual access points may be provided as shown in Figure 8b. A separate illuminating means can be provided for

each chamber in the multi-chamber configuration described above.

[0044] In one configuration a display unit 302 is also provided on the external face of front panel. This display unit can be used for Proof of Delivery or Proof of Collection purposes. The display unit may be a fixed identifier displaying data unique to the particular locker, such as a bar code, personal details of the owner of the box, an address or geographical coordinates such as GPS coordinates. Alternatively, the display may be a programmable display. The display may be programmable by the control unit 119. The display may be programmed to display real time date and time information and/or a programmable data code unique to the locker. Data code formats include bar codes such as, but not restricted to UPC (Universal Product Code) and QR (Quick Response) Code formats. The display unit may also display information which is scannable. On making a delivery, for example, the delivery person may scan the display unit and/or the parcel label barcode. This scan can be used for delivery tracking and proof of delivery. Similarly, if a package is being collected from the locker, the collector may scan the display for proof of collection. The display unit 302 may be used to assign unique data codes to individual parcel objects. For each delivery an alternative code may be displayed on the display unit.

[0045] One or more internal secure chambers with locking mechanisms are optionally provided. These internal chambers may be used for storage of payment in a charge on delivery scenario. Access to these secure chambers is preferably restricted to approved persons only. This programming may be implemented using the mechanism described above.

[0046] A preferred configuration of the locking mechanism 108 and receiver plate 1082 is shown in Figure 3, and Figures 10 to 15. Referring to Figures 3 and 4a and 4b, the locking mechanism 108 includes a first component 1081 having a lock bolt 303 and a lock barrel 304. A receiver plate 1082 includes a sensor 1084 and a bolt catch hole 1086 for engaging the lock bolt. The lock bolt 303 is moveable between an extended and a retracted position. In the open state shown in Figure 14, the bolt 303 is in an extended position but is not engaging the catch hole 1086. In the locked state shown in Figure 15, the bolt 303 is in an extended position with the bolt 303 extending through the bolt catch hole 1086 to retain the access panel in a locked position. In a closed but unlocked state the bolt 303 is in a retracted position and does not extend through the bolt catch hole. The access panel is then free to open. The receiver plate 1082 in a preferred configuration includes an extension plate 1087 as shown in Figure 10. The extension plate 1087 extends at an angle from the main body 1082 of the receiver plate. The angle is preferably obtuse. When moving from the open state to the closed but unlocked state the extension plate 1087 cooperates with the bolt 303 to move the bolt from the extended position to the retracted position. Once the extension plate 1087 is pushed past the bolt, the bolt

can then extend into the bolt hole to retain the access panel in a locked position as shown in Figure 15. The application of this configuration is that the extension plate automatically engages the locker to the lock state when the front panel is closed, thus removing the need for the delivery person to lock the locker after making a delivery and closing the panel.

[0047] In the configurations of Figures 11 to 15, an additional stop member 1088 is provided. This stop member is slideably mounted on the catch plate 1082 in the region of the bolt catch hole 1086. In the configuration shown in Figure 11, the stop member comprises a front plate 305 and a back plate 1090. The front and back plates are joined using a plurality of connector clips 1089. The front plate 305 of the stop member has a curved edge 1092 which extends obtusely from the front plate 305 of the stop member. The curved edge 1092 extends away from the back plate 1090. In a first position shown in Figure 13, the stop member 1088 is positioned over the bolt hole 1086. This maintains the locker in a closed but unlocked position. When the stop member is over the bolt hole, the bolt 303 cannot extend into the bolt hole. To make a delivery to the locker, the door is opened and the bolt moves from the retracted position to an extended open position. When the door is pushed closed, the extended bolt engages with the curved edge of the stop member and pushes it back to a position proximal to the bolt hole but not covering the hole as shown in Figure 12. The bolt is then free to extend into the bolt hole and into the locked position. The stop member 1088 facilitates a once off secure delivery being made without the need for access authorisation. A delivery person can open the access panel without contacting the locker owner, pressing a keycode, or ringing the locker, etc. In preparation for a once off delivery the locker owner places the stop member in the first position shown in Figure 13 and leaves the locker with the access panel in the closed but unlocked state awaiting a goods delivery. When the delivery person arrives he opens the locker's unlocked access panel, places the delivery item in the locker and closes the access panel. On closing the access panel the stop member is automatically pushed back to the position proximal to the bolt catch hole as shown in Figure 12, and the bolt 303 engages in the bolt hole 1086 as shown in Figure 15. The locker is therefore in a locked state.

[0048] An exemplary system is shown in Figure 16. The system comprises a locker 101 in communication with a first Party and a second Party. Party1, for the purpose of the following examples, is the person or entity to whom the delivery to or collection from of items, parcel goods or post goods items takes place. Party2, is the entity such as a courier who is delivering or collecting the goods or items. The locker is also in communication with peripheral appliances such as sensors. Party1, Party2, and the locker are capable of communication using any suitable global communications system. Party1 configures the locker and sets the control parameters for use.

These programmable methods facilitate the delivery (or collection) of parcel and post objects to the locker. Party2, depending on the predefined configuration is provided with means to access and deliver (or collect) goods in the locker. The configuration parameters set using the methods described above also determine how the locker notifies Party1 of the delivery (or collection). For example, programmable configuration parameters for the controller allow Party1 to select the mode of operation. These control parameters may be selected on a personal communication device by Party1 and subsequently communicated to the locker via the global communications module. Personal communication devices include telephones, mobile phones, smart-phones, internet/computer, Wi-Fi device, etc. Parameters can be programmed to allow Party2 to have once-off access, scheduled access, etc. For example, Party1 can program the locker to accept deliveries from one specific Party2 at any time during work hours while also allowing only one delivery from another Party2. Party1 retains control of the locker and can control or change the operation parameters at any stage. The locker may also be configured by Party1 as to the communication mechanism used to issue alerts. For example, tamper alerts may be forwarded via SMS message, parcel delivery audit trails by electronic mail, and photographs or video streams posted via a local area network to a website or cloud storage location. The locker may also be configured by Party1 as to how Party2 may interact with the locker. For example Party2 may be authorized to open the door by ringing the locker with a telephone call, and to open the envelope flap with a push code sequence using the push button. Alternative access means can be provided through the communications means including Zigbee, Z-Wave, Wi-Fi, connection to an intercom, etc.

[0049] Party1 may program the locker with details of one or more Party2 contacts. Once programmed the locker can compare authorised numbers with the incoming Party2 calling number and use this functionality to enable or disable Party2 from opening the locker. Similarly, Party2 access may be confined to a programmable scheduled date/time slot as determined by Party1. As an example, Party1 may program the locker to only allow a Party2 mobile number open the locker within designated business hours. For example, Party1 may send a series of SMS messages to the locker. This SMS contains a predefined series of commands. The controller receives the text messages and configures the system accordingly. For example, Party1 may send a text message with a relevant command word followed by a sequence of mobile numbers. If Party2 has one of these mobile numbers then a call from Party2 will be authorised to open the locker.

[0050] A current GPS location of a smartphone can be provided via the communication module to the locker. A comparison by the controller of the GPS coordinates of the locker with the GPS coordinates of the smart phone can be used to ensure that Party2 is in the correct loca-

tion, i.e. at the locker, before access is provided to the locker. In this way the locker can prevent an authorised Party2 from accidentally opening the locker, through for example a mistaken call, when Party2 is not in the vicinity of the locker.

[0051] The locking mechanism can be configured as a fail safe lock that goes to the locked state in the event of power failure. In this way security is maintained even during power failure. Party1 may lock/unlock the locker using a manual key during this power failure.

[0052] Peripheral items 300 include the sensors as described above, but it will be appreciated the peripheral items are not restricted as such. The global communications 400 include the communication module described above in relation to Figure 1.

[0053] In one configuration Party2 may be provided with a security code which can be used to unlock the access panel. This security code can be input using, for example, an electronic keypad. Alternatively a specific key press sequence could be provided. It is also appreciated that Party2 may be provided with a specific telephone or access number which when dialled is recognised by the communications module. The communication module can then send a command to the control unit to allow access to the storage chamber. This security code can be operable for example, on a one off basis, within a specific time frame, or on a timer schedule. Similarly a separate code may be provided by Party1 to enable Party2 to access the envelope flap.

[0054] A buzzer or other audio generator can also be provided. This buzzer may be controlled by the control module 119. On opening the access panel the buzzer is activated and remains active until the access panel is closed following a delivery to the locker or a collection from the locker. In the event that a delivery is made and the access panel is left open a warning message may be issued to any relevant Party.

[0055] In a further configuration, the communications module 113 is connected via control leads connected to connectively points 114 enabling the locker to be connected to one or more similar lockers. Alternatively the lockers could be connected by wireless means by using their communications modules. This configuration can be used for data sharing and/or Master/Slave functionality. For example, a number of lockers could be installed in a complex such as a hospital, university, industrial complex or the like. One locker is designated as a master unit and the remaining units as slave units.

[0056] In such a configuration Party1 communicates with the master unit which in turn can communicate with and manage the Slave units. In a larger cluster, one master unit could be configured to communicate with one or more sub-master units, which in turn would communicate with individual batches of slave units. Each sub-master would control one or more slave units. For example, a cluster of fifty lockers may have 1 master unit which in turn is configured to manage three sub-master units. Each sub-master may be configured to manage fifteen

slave units. Party1 would then communicate with the master unit which would in turn communicate with the slave units via the sub-master units.

[0057] Any locker of the plurality of lockers could be configured to operate as a master or slave unit.

[0058] It will also be appreciated that the master unit may simultaneously also be used as a delivery/collection locker. For example, Party1 would communicate by text or SMS message to a master unit. This communication may include valid opening times for slave units. The master would then communicate the time schedules to the slave units. In another configuration, the master unit would be configured to collect and compile audit information from the slave units. Once compiled the master unit would then communicate the compiled information to Party1. The master unit in an alternative configuration may maintain a record of empty slave units. The master unit may then communicate with Party2 using the communication means outlined above to direct Party2 to an available or empty location. For example, in response to a call from Party2, the master could reply via SMS message to Party2 with the number or location of an available unit. The master may also communicate with the available unit to unlock this unit in advance of delivery. The available slave unit may also communicate with the master once delivery has taken place. The master may then alert Party1 to the delivery. It will be appreciated that this is merely an exemplary communication and one or more steps may be omitted. In a further configuration, the slave units may have different sized chambers. The master unit may interact with Party2 such that the most appropriately sized empty slave unit is allocated for a particular delivery. Lockers within a cluster may be remotely located relative to each other. Units could be located at varying locations within a campus, hospital, or complex.

[0059] It will be appreciated that the use of a Master/Slave configuration is dependant on communication between two or more lockers. In such an environment security may be compromised should the communications network be interfered with, irrespective of the communications channel chosen, whether Wi-Fi, GSM, etc. A similar security risk exists where a standalone locker is at a location and managed by Party1 using the GSM network. Should the GSM network be 'jammed' or otherwise 'blocked' or interfered with by a third Party then the locker would have no means to alert Party1 should it be tampered with. To overcome the risk of 'jamming' the locker apparatus incorporates an 'anti-jamming' feature which is based on communication 'pairing' involving a 2 way handshake, and is explained as follows.

[0060] The locker apparatus may be programmed by Party1 to telephone a 'paired' remote device on a periodic basis. The 'paired' device could be a second locker or a 'black box' device supplied by the manufacturer for the purposes of 'pairing'. For the purposes of explanation it will be assumed here that the pairing device is a second locker, and the lockers are referred to as locker1 and locker2. To configure the 'anti-jamming' feature, Party1

sets related parameters in each locker, including the time period parameter, the telephone number of the paired locker, the telephone number of the Party to alert should 'jamming' be detected in the paired locker, whether to alert via SMS text or a call, the enable/disable pairing parameter, etc. Retry and delay parameters provide for more advanced 'jamming' detection.

[0061] In one configuration, when the 'anti-jamming' feature is enabled on each locker in the pair, locker1 rings locker2. In one configuration, locker2 rejects the call on detecting the incoming call is from locker1, and because of this no call costs are incurred by locker1. Locker2 then waits a pre-programmed delay before responding by calling locker1. Locker1 in turn rejects the call from locker2. Again this avoids the call costs being incurred. The process repeats on a periodic basis as programmed. Should either locker be jammed then it will not be capable of calling the paired locker which in turn will treat as communications breakdown or 'jamming'. In this absence of the expected call back the paired locker will alert the locker owner that jamming is taking place.

[0062] A plurality of configurations for operation of the system of Figure 16 are described below. It will be appreciated that the examples outlined herein are merely examples and the operation of the system is not restricted as such.

[0063] Multiple options exist for configuring the lockers for delivery. For example, Party2 may contact Party1 who remotely unlocks the locker for a delivery when contacted by Party2. Verification is performed by Party1 in this case. Alternatively, verification may be performed by the locker. In such a scenario, the locker is pre-programmed by Party1 with details of Party2. These details may also be stored at a remote database such as a webserver. The communications module of the locker contacts the remote database to obtain the preprogrammed details. Party2 contacts the locker directly and if their contact details are matched with the preprogrammed details, access is permitted. Additionally, it is possible to allow access within a particular time window. This additional criterion is compared with the contact details from Party2, for example a time stamp on a telephone call. Any comparison criteria may be implemented. Party2 may also be provided with a single access or any time access. In a further embodiment, Party2 may contact the locker directly and Party2 details are then forwarded to Party1 for verification. Once verified a message is sent from Party1 to the locker to confirm access. Goods may then be delivered to the locker. Proof of delivery including one or more images taken by an internal camera and/or by scanning a barcode within the locker is also implemented.

[0064] In an alternative configuration, a once off delivery can be facilitated. The locker may be retained in a closed but unlocked position. When the door is opened and the parcel is delivered the door is again closed and the lock bolt can then engage the bolt hole and securely retain the delivery within the storage chamber. A once off delivery can also be facilitated by using a push button

109. The locker is retained in a locked position. When the push button is pushed the locker is opened/unlocked and a delivery can then be made. On closing the access panel, the locker may be automatically locked thus preventing unauthorised opening. Further push button access may be prohibited. Alternatively, a push code sequence could be used. Separate push code sequences could be assigned to a plurality of Party2s.

[0065] The locker control module may also be configured to communicate with electronic gates. Electronic gates may be instructed to open to facilitate a delivery using any of the mechanisms outlined above.

[0066] Deliveries may be notified to Party1. This notification may be an alert that a parcel or envelope has been delivered or any of the proof of delivery mechanisms described above. Where multiple chambers exist separate alerts may be generated for delivery to each chamber.

[0067] Whilst described above in relation to a single chamber unit, it will be appreciated that the envelope flap may be configured for similar access using similar protocols. It will be appreciated that allowing access to the envelope flap for certain time periods only may limit the delivery of junk mail. Similarly allowing restricted access using keycodes or mechanical keys limits the amount of junk mail received.

[0068] Access can be provided individually to separate chambers. For example in a two chamber configuration, Party2 may have access to one chamber but not the other. Other parties may be given access to both chambers.

[0069] Jamming or network detection can also be detected and alerted upon by pairing two units. The units periodically communicate and thereby monitor each other. If the communications between the two units are jammed or otherwise fail an alert can be sent to alert the unit owners.

[0070] Proof of delivery can be implemented using a front facing camera 121 to take a picture or series of pictures as the goods are delivered, and/or the goods Bar Code(s).

[0071] The words "comprises/comprising" and the words "having/including" when used herein with reference to the present invention are used to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof. It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable sub-combination.

[0072] Further examples of various configurations of a locker in accordance with the present invention are described below.

Example 1 Parcel delivery with remote unlocking

[0073] Party2 is aware of the telephone number of Party1. The locker has been locked by Party1, either by using the mechanical key or remote communications.

a) Party2 arrives at the locked locker and rings Party1; b) Party1 decides whether or not to unlock the locker. Assuming the decision is to unlock: c) Party1 remotely unlocks the locker using the communications means; d) The locker may sound an intermittent buzzer which remains active until the door is locked again; e) Party2 deposits the delivery object in the storage chamber; f) Party2 may scan the 'Proof of Delivery' identifier and closes the door; g) The door then locks and the buzzer is disengaged; h) Party1 is sent a notification indicating when the goods were deposited. Notification could be by SMS text, email, Zig-Bee, etc; Party1 subsequently retrieves the delivered object.

Example 2 Parcel Delivery with local unlocking

[0074] This example may be used in the delivery of 'once-off' goods from a known Party2. Party1 programs Party2 details into the locker in advance using the communications means. Details may be edited (enabled, disabled, deleted, etc) by Party1 at any time. For example, Party1 programs Party2 details on a website and the details are retrieved into the locker using GPRS communications or Wi-Fi communications where a wireless LAN (Local Area Network) is present. Details include Party2 phone number, name, access 'time-window', etc. Party1 may program the locker with the details for multiple Party2s.

a) Party1 locks the access panel, either with a manual key or by communication via the control box (119); b) Party1 enables the locker for Party2 mobile number access; c) Party2 arrives at the locker and rings the locker; d) The locker attempts to validate (identify) the incoming calling number; e) On successful validation the locker unlocks the front door and sounds an intermittent buzzer; f) The buzzer remains active until the door is locked; g) Party2 deposits the delivery object in the locker; h) Party2 scans the 'Proof of Delivery' identifier and closes the door; i) The locker locks the door, disengages the buzzer and disables Party2's phone number from further access; j) The locker sends an alert to Party1 indicating when the goods were deposited and by whom. It will be appreciated Party1 could program the locker to allow for anytime local unlocking, or local unlocking within a date/time schedule, etc. In addition Party1 could program the locker differently for different Party2 contacts. For example a 'once off' access could be granted to one Party2 while anytime access could be granted to another Party2, etc.

Example 3 Parcel Delivery with 'scheduled' unlocking

[0075] In this example scheduled delivery is allowed at specific time intervals from a known Party2. It is assumed in this example that Party2 knows the locker telephone number.

a) Party1 locks the locker front door, either with a manual key or by communication via the control box (119); b) Party1 programs the locker control unit with an allowable access time window (date, time) for Party2; c) Party2 arrives at the unattended locker and telephones the locker; d) The locker attempts to validate (identify) the incoming calling number; e) The locker also validates against the allowable access time schedule; f) On successful validation the locker unlocks the front door and sounds an intermittent buzzer. The buzzer remains active until the door is locked; g) Party2 deposits the delivery object in the locker; h) Party2 scans the 'Proof of Delivery' identifier and closes the door; i) The locker locks the door and disengages the buzzer; j) The locker sends an alert to Party1 indicating when the goods were deposited and by whom.

Example 4 Parcel Delivery using Push Button Access

[0076] In this example Party1 programs the locker to unlock when a key press, or a specific time related code sequence, is entered via the keypad. Party1 may program the locker to allow a once-off access, a time scheduled access, or an anytime access.

a) Party1 locks the Locker access panel, either with a manual key or by communication via the control box (119); b) Party1 programs the locker to unlock with either a push button (109) key press or a time related code sequence; Party1 programs the locker for either once-off, timed, or anytime access; c) Party2 arrives at the locker location and presses the push button (109); d) The controller unlocks the front door. The buzzer is sounded intermittently and remains active until the door is locked; e) Party2 deposits the delivery object in the locker; f) Party2 scans the 'Proof of Delivery' identifier and closes the door; g) The locker automatically locks the door and disengages the buzzer; h) Further push button access (109) is disabled; i) The locker sends an alert to Party1 indicating the goods delivery.

[0077] It will be appreciated that different button press code sequences may be assigned to different Party2 contacts. This way the locker could track who has delivered parcels and when. In addition different Party2s could be assigned with different access times such as once-off access, access within particular time schedules, etc.

Example 5 Parcel Delivery to a locker at a location secured by an electric gate

[0078] This method may be used to accept unexpected deliveries from any Party2 where the locker is located within a property accessed via an electric gate. It is assumed in this example that Party2 knows the telephone number of Party1. Party1's telephone number could for example be previously declared to Party2, etc. It is also assumed that the locker is connected to the electric gate controller.

a) Party1 locks the locker front door, either with a manual key or by communication via the control box (119); b) Party1 departs and locks the electric gates; c) Party2 arrives at the location and rings Party1; d) Party1 optionally decides to allow access and remotely instructs the locker to unlock the electric gates; e) Party2 enters the property; f) Party2 presses the locker push-button and the locker opens; g) The buzzer is sounded intermittently and remains active until the door is locked; h) Party2 deposits the delivery object in the locker; i) Party2 scans the 'Proof of Delivery' identifier and closes the door; j) The locker automatically locks the door and disengages the buzzer; k) The locker sends an alert to Party1 indicating when the goods were deposited; l) Party2 leaves the property; m) The electric gates are locked securing the property.

[0079] It will be appreciated other configurations exist. For example, Party1 may program the locker to unlock the front gates when called by any authorised number, etc. Similarly the audio generator may be programmed to issue messages such as 'Please keep a safe distance from these gates', etc.

Example 6 Letter Post management

[0080] A number of options exist when handling the receipt of letter post to the locker. For example, the locker may be programmed to maintain the envelope flap in a locked/unlocked state on a permanent or time scheduled basis, to reduce if not eliminate the receipt of unsolicited post including junk mail and unwanted promotional material. Party1 could, for example, program the locker to automatically lock the envelope flap for the remainder of the day after a first post delivery occurs. Or Party1 could program the locker with a key press code used to provide Party2 access when the envelope flap is placed in a permanent locked state. In addition, the locker could be programmed to issue an alert message to the locker owner when post is received. A typical operational example follows:

a) Party1 communicates to the locker a date/time schedule in which to unlock the envelope flap electric lock, to unlock from 08.00 to 12.00 each weekday

morning when the postman is due, and to lock at all other times and weekends; b) the locker unlocks the envelope flap at 08.00 each weekday morning; c) Party2 arrives at the locker and if within the time window opens the envelope flap and delivers the letter post; d) The locker detects the flap has been opened/closed and communicates an incoming post alert to Party1; e) The locker secures the letter post at 12.00 by locking the envelope flap thus preventing unsolicited mail for the remainder of the day.

Example 7 Letter Post security

[0081] This example applies to a multi chamber locker embodiment such as the 2 chamber embodiment shown in Figure 8, where in some instances it may be desirable to ensure that access to the letter post is kept secure at all times and independent of parcel deliveries. In the two chamber locker embodiment a drop down shelf (124), which can be locked/unlocked with an electric lock (24), may be configured to restrict post retrieval to Party1 only. Using this lockable drop down shelf embodiment, Party2 can have access only to the lower parcel chamber. In this example it is assumed the drop shelf is maintained in the locked position prior to operation.

a) Party2 arrives at the locker and opens the envelope flap; b) Party2 delivers letter post through the envelope flap; c) The locker detects when the flap is opened and also when it has closed and communicates an incoming post alert to Party1; d) Party1 arrives at the locker and opens the front door electric lock, using either a manual key or communications method. The locker identifies that Party1 has opened the unit, and simultaneously unlocks the drop-down shelf giving Party1 access to the letter post; e) Party1 retrieves the letter post and returns the drop-down shelf to the closed position; f) Party1 closes the front door and the locker automatically locks both the drop-down shelf and front door.

Example 8 Parcel Collection/Pickup

[0082] Parcel pickup differs from Parcel Delivery in that Party1 contacts Party2 requesting parcel collection from the unattended locker. As with Parcel Delivery, Party1 may configure the locker in a number of different ways. The following illustrates a typical sequence of operation.

a) Party1 uses the communications means to configure the locker for parcel collection by Party2. Several options exist. For example the locker could be programmed to open the front door on receipt of a phone call from Party2, within a scheduled time window, etc. Or the locker could be programmed to open the front door when the push-button is pressed, within a scheduled time window, etc; b) Party1 may program the locker to switch the internal light ON when

the door is opened by Party2 and OFF after the collection is made; d) Party1 may program the unit to turn on external lighting within a scheduled time window; e) Party1 places the parcel object to be collected in the locker and locks the front door; f) Party1 contacts Party2 requesting parcel pickup. Party1 explains to Party2 how to access the locker, whether by ringing it, calling Party1, or pressing the push button, etc; g) Party2 arrives at the unattended locker and opens the front door. The buzzer is sounded intermittently and Party2 retrieves the parcel object; h) Party2 takes a 'Proof of Collection' timestamp and closes the door; i) The locker locks the front door and turns external lights off, etc; j) The locker alerts Party1 that the parcel has been collected and when, by whom, etc.

Example 9 Detecting and responding to communications jamming and faults

[0083] It is assumed in this example that a Master Slave unit combination is being used and for security purposes detection of jamming or network breakdown is enabled. The two units could be situated at different locations, for example the Master unit could be located at the locker owner's private residence while the Slave unit could be located at a holiday home, a workplace location, etc.

- a) Party1 programs the two units, one configured to behave as the Master unit and the other the Slave unit;
- b) Party1 enables 'jamming' detection on each locker. Party1 'pairs' the two lockers, with the Master configured to periodically communicate with the Slave, and vice versa the Slave configured to periodically contact the Master. The two units monitor each other;
- c) The units are configured to make 3 retries in the event of detecting a first jamming occurrence before deciding jamming has occurred;
- d) Party1 configures each locker to text a 'jamming alert' to Party1 in the event jamming is detected or a network breakdown occurs with the other locker.

Example 10 Internal Environmental Control Example

[0084] It is assumed that a locker is at a location where it is exposed to freezing conditions.

- a) Party1 enables freeze detection (this parameter is pre-set on by default);
- b) Once freeze detect is enabled the locker monitors temperature within the apparatus;
- c) On detection of temperature falling below a preset value (this can be re-programmed by Party1) the Control unit within the locker turns on the heating element. The Control Unit software also determines whether to turn on the internal fan for air circulation purposes;
- d) Once the internal locker temperature rises above a preset value (programmable)

the Control unit turns the heater element off; e) The sequence is repeated as required.

[0085] Similarly the locker may be configured to respond in a corrective way if located where environmental conditions including high heat and high humidity levels are detected, etc. Furthermore, the locker may be programmed to periodically access the internet web via the communications interface and access weather and climate forecasting sites for the purposes of determining prevailing weather conditions.

Example 11 Data recording and Proof of Delivery

[0086] It is assumed here that for Proof of Delivery Purposes a visual image of the courier is required. Certain assumptions are made here, such as for example Party1 has programmed the locker to issue an alert after a delivery is made.

- a) Party1 locks the locker access panel;
- b) Party1 programs the locker control to grant Party2 mobile number ring access;
- c) Party2 arrives at the locker and rings its number;
- d) The locker unlocks the front door lock;
- e) On detecting Party2 opening the access door the locker turns on the front facing camera and takes either a photograph, a sequence or photographs, or a stream video of Party2;
- f) Party2 deposits the delivery object and closes the access panel door;
- g) The locker turns the front facing camera off and alerts Party1.

[0087] The front facing camera could also be used to scan and record the delivery item's bar code for Proof of Delivery purposes. For example, the camera could be programmed to take a snapshot when the access door is open and the push button is pressed. In this case Party2 would, after opening the access panel, place the delivery object's Bar Code in view of the camera and press the push button initiating data recording. The action sequence could also be prompted by the audio generator if so programmed. Furthermore the internal camera could be used to record images of the locker contents both before and after the delivery is made. Recorded data could be transmitted with time/date stamp to Party1, to a website, etc. Furthermore the delivery person could also scan the locker's unique bar code as displayed on the display window 302 and use this for delivery audit trail verification, etc.

Example 12 Interfacing to External devices & Security

[0088] This locker may be used to control & monitor external devices including but not limited to motion sensors, sirens, camera, electric gates and external lighting. Programming means are provided for Party1 to program the locker as required. For example, the locker can be programmed to:

a) Open an electric gate to an industrial property on a scheduled basis, during business hours, etc; b) Open electric gates on detection of selected incoming phone number; c) Switch external lighting ON at scheduled times, night deliveries, etc; d) Switch external lighting ON in response to the detection of a signal from an external motion sensor; e) Switch external camera ON when detecting a signal from an external motion sensor or the internal vibration tamper sensor; f) Activate an external alarm siren if the locker is tampered with; g) Switch the internal light on during deliveries made outside of daylight hours; h) issue instructions via the audio generator.

Example 13 Tracking & auditing

[0089] The locker may be programmed to maintain a sequenced log of all parcel and postal deliveries. This data may be used for administration purposes, and contains information including Party2 details, when Party2 made the delivery, time & date of delivery, camera recorded data, when Party1 delivered/retrieved the package, etc. Data logs could be posted to a web-site, sent by email to Party1, or retrieved directly from the locker or from the website by Party1's smart phone, etc.

Example 14 Communication between lockers

[0090] A locker may be configured to communicate to a similar locker. For example, assume a location such as a hospital, university campus, airport, apartment complex, etc where there may a number of lockers located in close vicinity, and possibly close to a Wi-Fi or Z-Wave local area network. These units may be programmed in a number of ways, for example:

a) Party1 accesses a website and configures all lockers using the local area network. Alternatively, one unit could be programmed to retrieve website information and in turn distribute this to the other individual units; b) any one locker could be programmed to retrieve information such as Party2 details, etc from (or send to) another locker.

Example 15 Master Slave operation, Communication between lockers

[0091] In a cluster of two or more units one may be configured as a Master unit and the others as Slave units. Such an arrangement could be deployed at a complex such as a hospital, factory, university, apartment, etc, with the Master unit acting as a coordinator for each of the Slave units. Some examples include:

a) Party1 programs the designated Master locker unit using any of the communications means, and the Master in turn communicates methods, Party2 contact names, time schedules, etc to the different

Slave units; b) The Master unit is programmed to collect and compile Slave unit audit trails on a daily (weekly, monthly, etc) basis before forwarding by email to Party1; c) The Master unit is programmed to track and manage the availability of Slave units. For example the Master could be programmed to keep one Slave unit open at all times, assuming at least one is empty and available for a delivery. Prior to a delivery, say in response to a call from Party2 to the Master unit, the Master could then communicate to Party2 the available Slave unit number, address, etc in which the delivery is to take place. On receipt of the delivery that Slave unit would automatically lock and notify the Master (say by WI-FI) which in turn could be configured to notify the recipient Party1 (say by Text or email) in addition to opening the next available Slave unit, etc; d) In another example the Slave locker units would have different size chambers and the Master unit could be programmed to interact with Party2 such that the most appropriate sized empty Slave unit is used for a delivery; e) In another example, say for demonstrative purposes a cluster of 11 locker units as shown in Figure 8, the Master unit could be configured to manage 2 'lower-level' Master units, each of which could be configured to manage 4 Slave units. In this example Party1 would communicate with the Master unit which in turn would manage the Slave units via the 'lower-level' Masters; f) Significantly, Party1 may configure any locker to operate as a Master or Slave unit; g) Significantly too, unlike other computer controlled delivery boxes, the Master unit in addition to being an overall manager can itself also be used as a delivery/collection locker unit.

Example 16 Locker generated Access Codes

[0092] This example demonstrates the use of a locker generated 1-time access code.

a) Party1 requests a 1-time access code from the locker; b) Party1 then issues the code to Party2 together with the mobile number of the locker; c) Party2 arrives at the locker and texts the 1-time access code to the locker mobile number. The locker opens and the parcel is delivered; d) The locker issues a text message to Party1 informing that a delivery has occurred. Once used the code is disabled.

[0093] A variation of this operation is where a permanent access code is issued to frequently used couriers and only enabled when a delivery is expected, or within specific date/time schedules, or when the locker is empty.

Example 17 Master Slave system with 1 time access

[0094] In this configuration a Master controls a cluster of Slave lockers, where a unique id number or name is

stamped on each box.

a) Party1 requests a 1-time access code from the Master; b) Party1 issues the 1-time access code to Party2; c) Party2 arrives at the location and texts the 1-time code to the Master unit; d) The Master responds with a locker id and opens it; e) Party2 delivers the parcel to the specified locker and the Master issues a text message to Party1 confirming a delivery has occurred.

[0095] An advantage of this method is that only the number of the Master is known to Party2. The decision on which Slave box to use is made only when Party2 arrives at the location thus optimising the use of the Slave boxes.

Claims

1. A locker for a delivery or collection system, comprising a storage chamber, an access panel for the storage chamber and an authorising unit for authorising access to the storage chamber via the access panel; the locker further comprising means for recording delivery or collection of goods from the storage chamber.
2. The locker according to Claim 1 wherein the means for recording delivery or collection of goods from the storage chamber includes at least one of the following:
 - a first device for recording data including a visual image of at the interior of the storage chamber;
 - a second device for recording identification data for identifying an accessor of the storage chamber; or
 - a display unit for displaying a unique identifier of the storage chamber.
3. The locker according to any previous claim further comprising means for recording the time and date of an authorised access.
4. The locker according to Claim 2 wherein at least one of the first or second device are configured to record identification data of the goods for delivery or collection, said identification data selectable from a list including a barcode, QR code or RFID code.
5. The locker according to any previous claim wherein the means for recording delivery or collection of goods is activatable on opening the access panel or on closing the access panel subsequent to an authorised access and/or means for recording delivery or collection of goods is remotely activatable.
6. The locker according to Claim 5 wherein the means for recording delivery or collection of goods is deactivatable on closing the access panel subsequent to an authorised access or after a predetermined time period or is remotely de-activatable.
7. The locker according to any previous claim further comprising means for detecting unauthorised interference with the locker and generating an alert in response to the detection.
8. The locker according to any previous claim further comprising a communication module for external communication with the locker.
9. The locker according to Claim 8 wherein the communication module is configured to periodically transmit a message to an external device and periodically receive a message from the external device wherein if a message is not received from the external device the communication module is further configured to generate an alert message.
10. The locker according to any previous claim further comprising an interface for interfacing with an external device, the external device including at least one of a motion sensor, a security gate, a security light, a camera or an audio unit.
11. The locker according to any previous claim further comprising means for controlling the internal temperature of the storage chamber.
12. The locker according to any previous claim wherein the access panel further comprises a flap through which goods can be deposited in the chamber.
13. The locker according to claim 12 wherein the authorising means comprises at least one of a locking mechanism for locking or unlocking the access panel or locking or unlocking the flap.
14. A delivery system comprising a plurality of lockers according to any of Claims 1 to 13 and further comprising a control unit for remote control of the delivery system.
15. The delivery system according to Claim 14 where a first locker of the plurality of lockers is configured as a master unit for controlling the remaining lockers in the plurality of lockers.

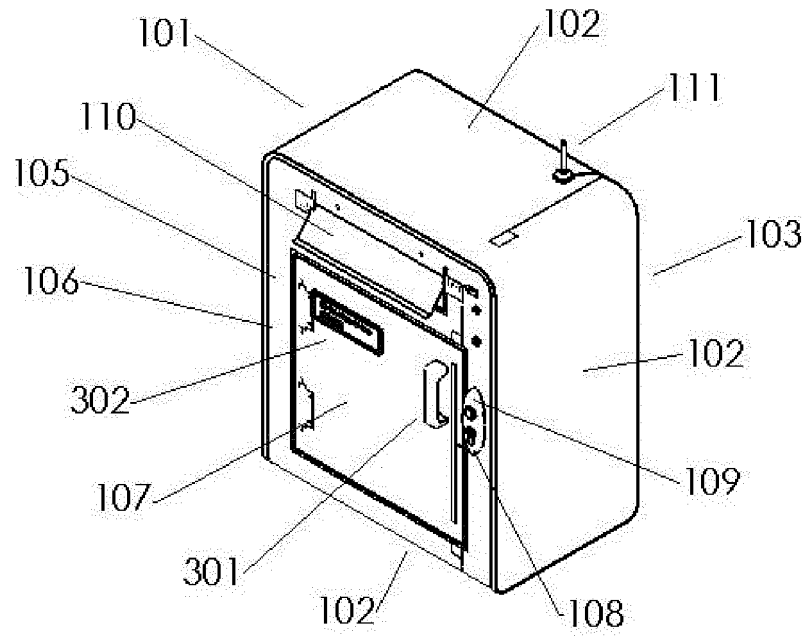


Figure 1

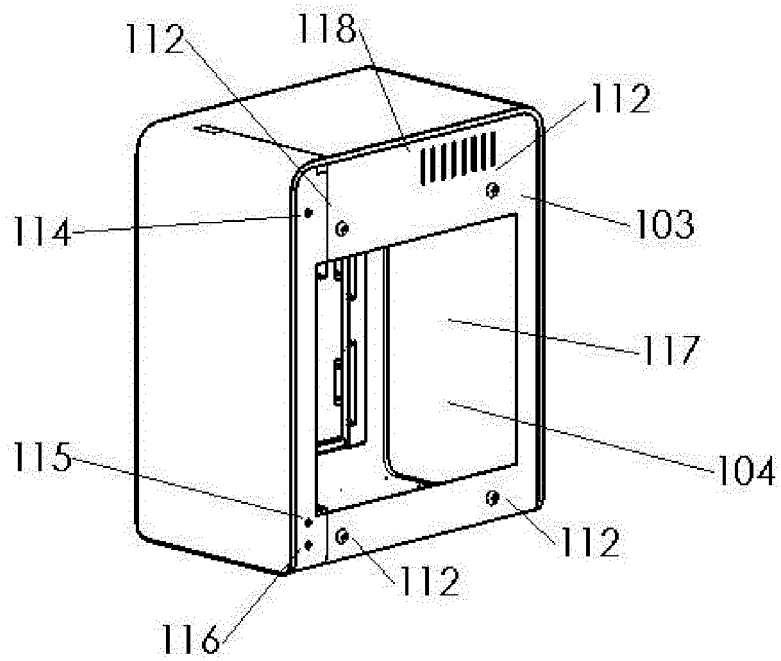


Figure 2

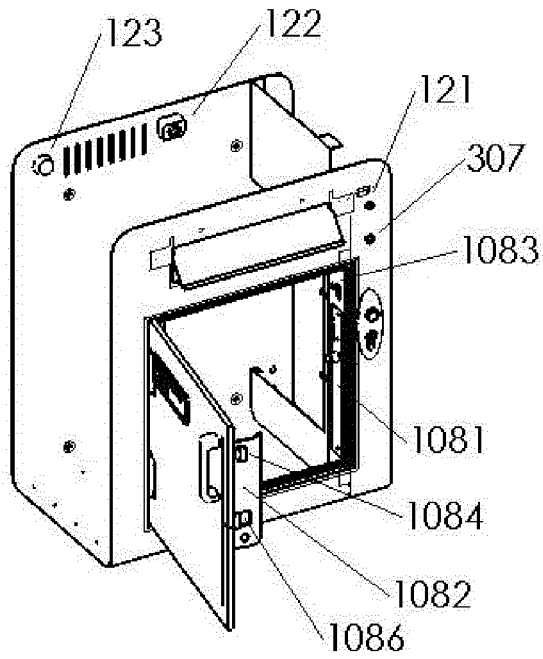


Figure 3

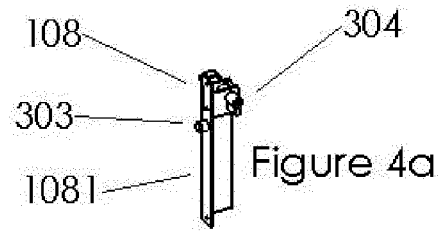


Figure 4a

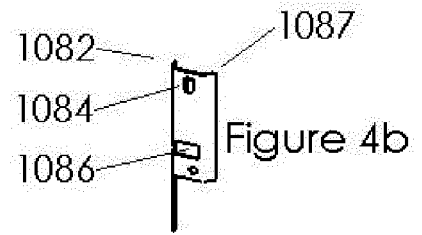


Figure 4b

Figure 4

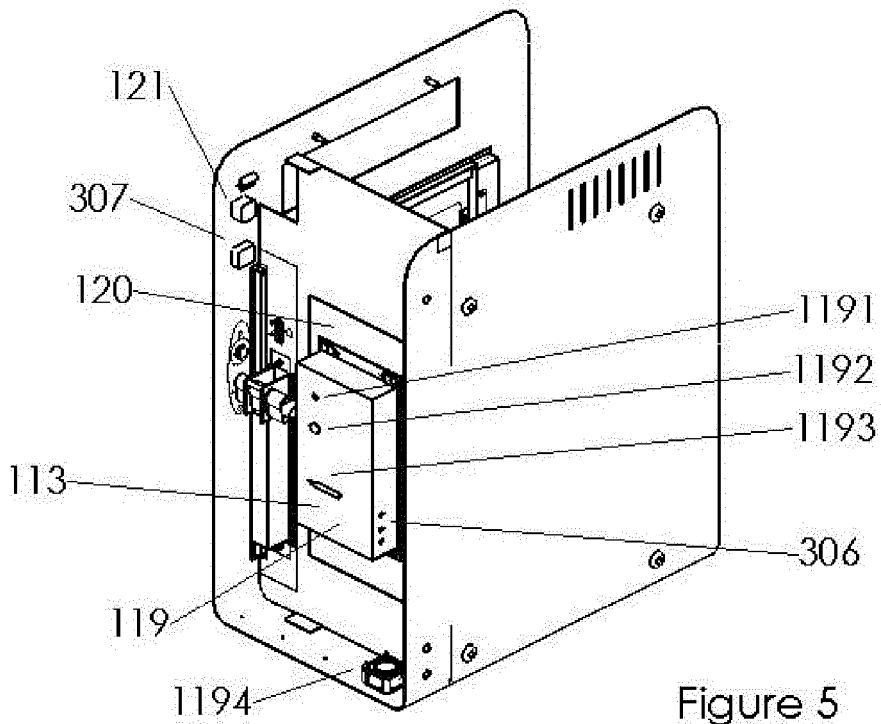
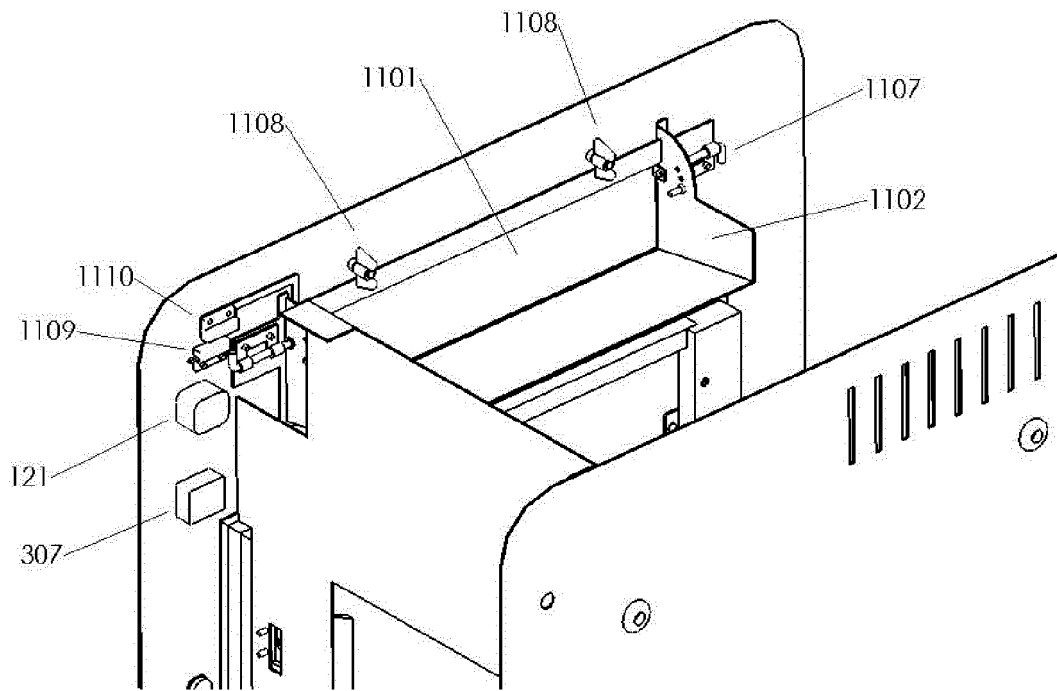
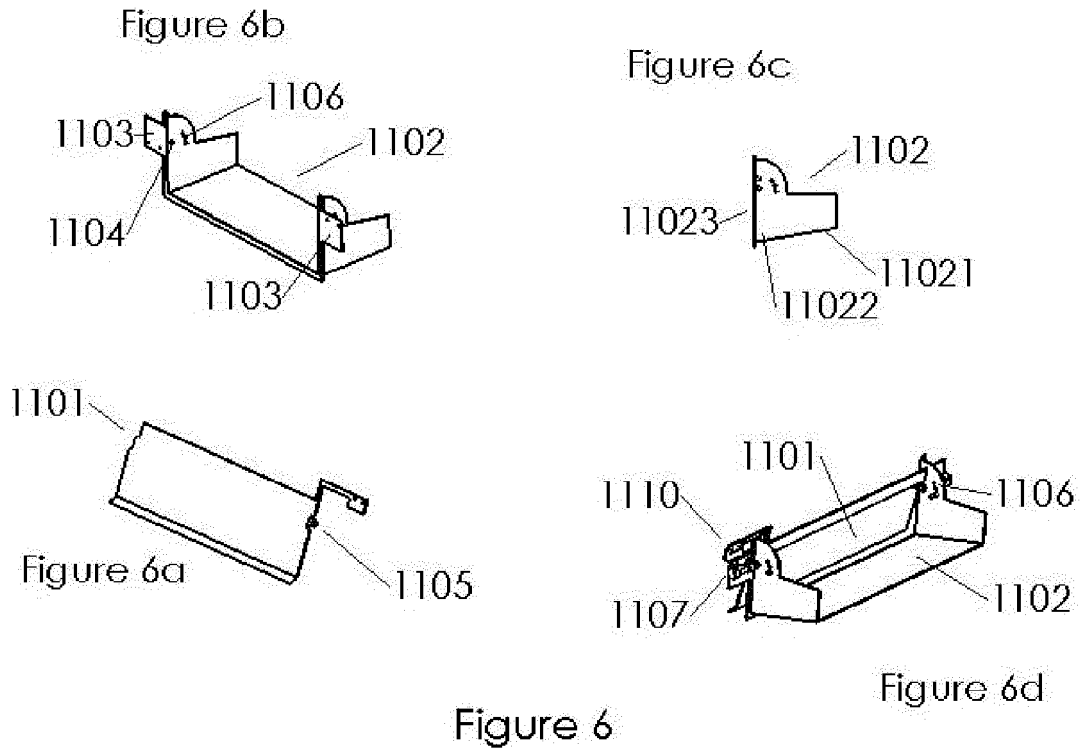


Figure 5



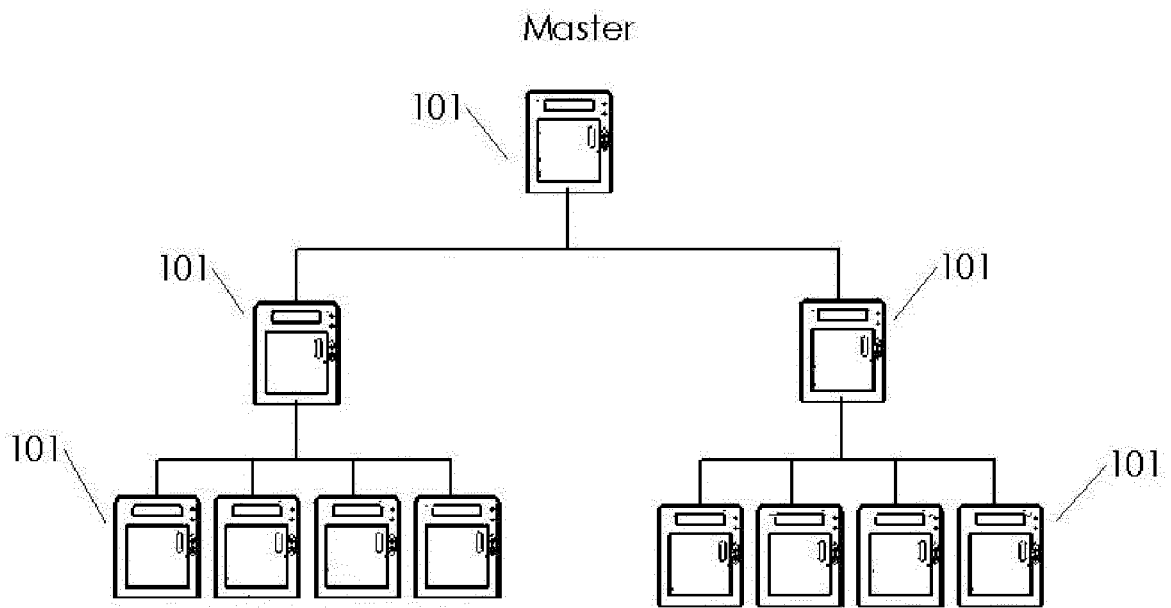
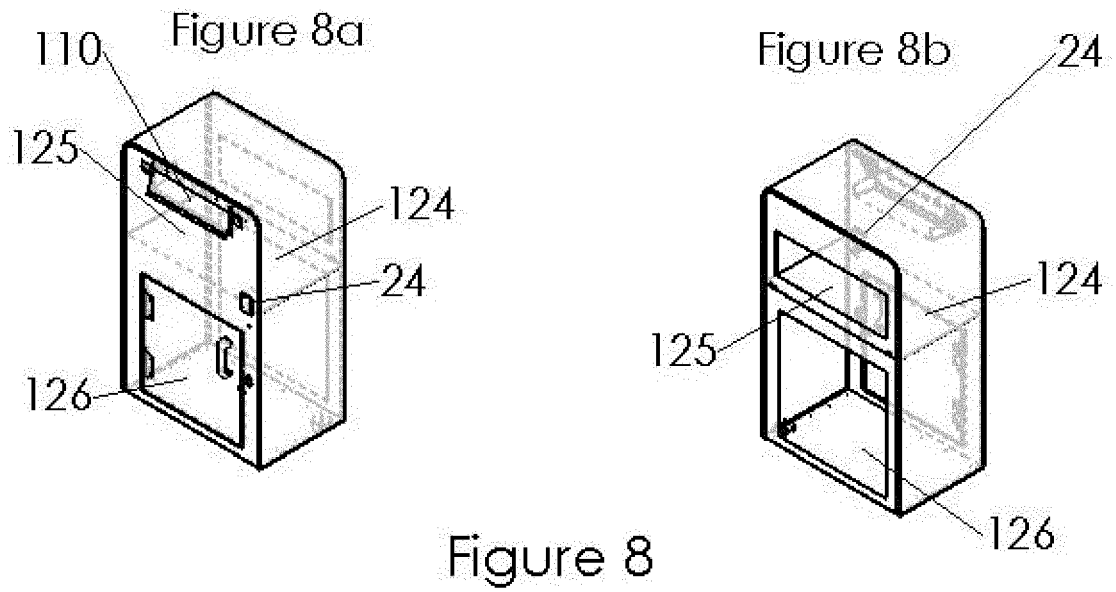
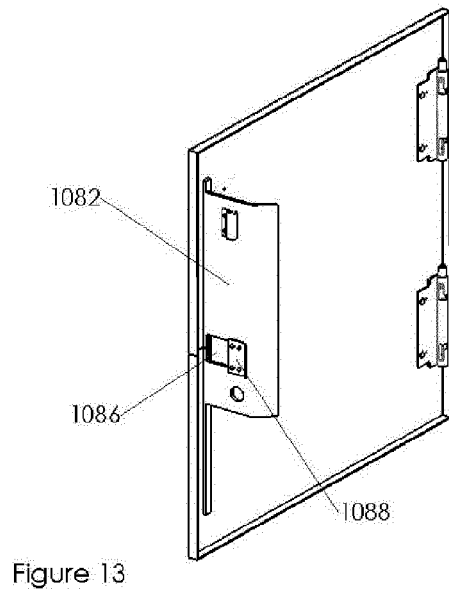
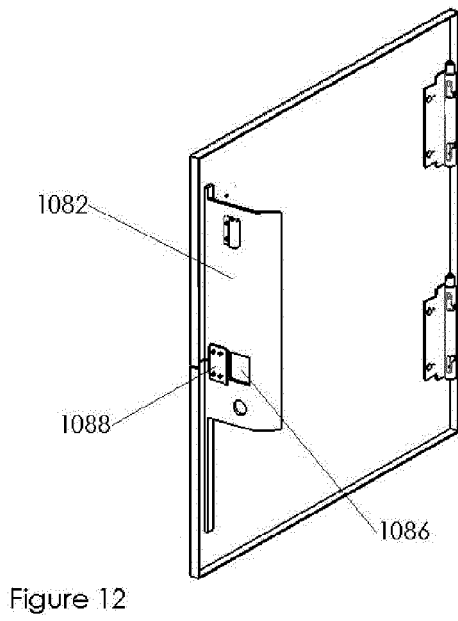
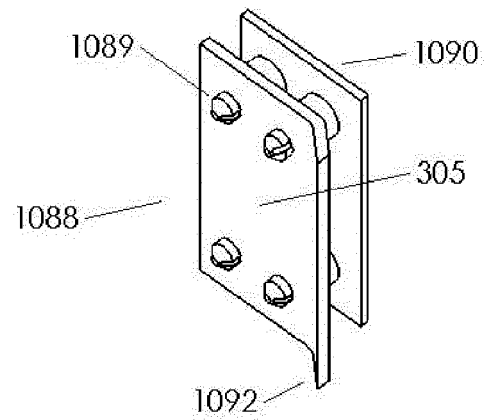
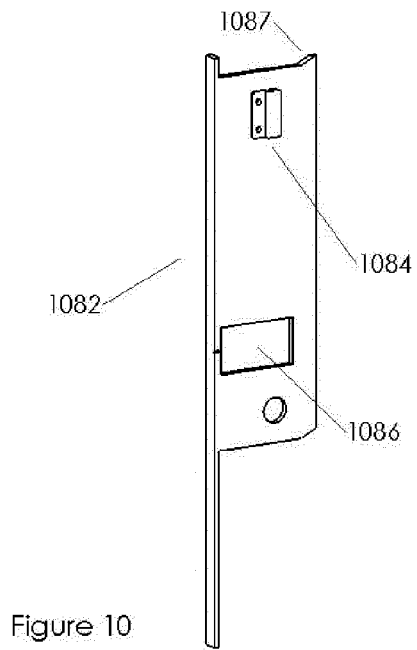


Figure 9



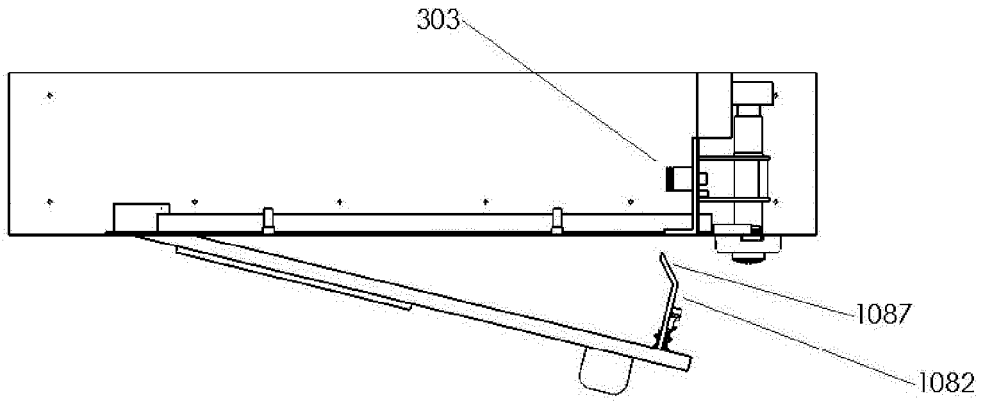


Figure 14

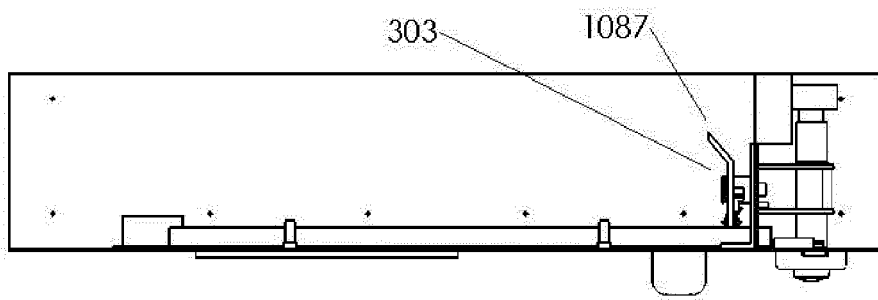


Figure 15

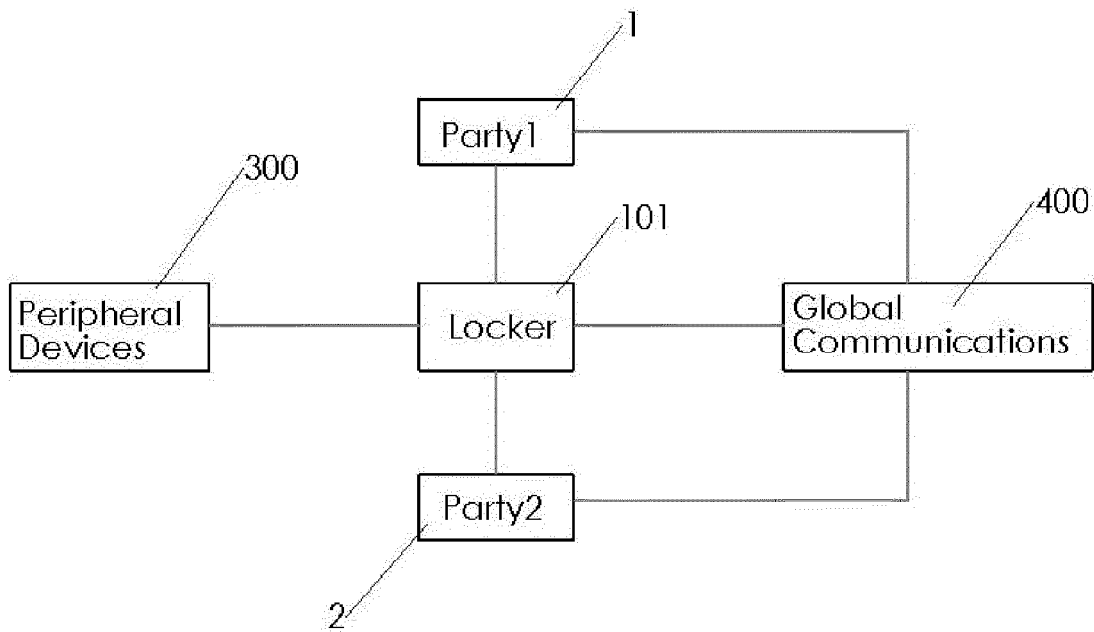


Figure 16

SS3308



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Place of search The Hague		Date of completion of the search 18 December 2013	Examiner Longo dit Operti, T
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